REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 1-12, 15 and 22-38 are in the case.

I. DUPLICATE CLAIM

The Action advises (page 3) that should claim 12 be found allowable, claim 31 will be objected to under 37 C.F.R. §1.75 as allegedly being a substantial duplicate of claim 12. In response, claim 31 has been amended to remove the possible overlap with claim 12. Amended claim 31 has basis in original claim 12. Withdrawal of this objection is respectfully requested.

II. CLAIM OBJECTIONS

Claim 10 has been objected to as allegedly containing a typographical error. In response, claim 10 has been clarified. Withdrawal of this objection is respectfully requested.

III. THE 35 U.S.C. §112, FIRST PARAGRAPH, REJECTION

Claims 2, 11, 12, 30 and 31 stand rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement. In response, claim 2 has been amended to specify that the steel, after hardening and tempering, has a hardness of 58-65 HRC and the microstructure containing 3-6% by volume of two hard phases, one of which is Cr_2N in a matrix that is essentially constituted by tempered nitrogen martensite which comprises residual austenite. Basis

for this amendment appears in original claim 2. Withdrawal of the written description rejection is now respectfully requested.

IV. THE 35 U.S.C. §112, SECOND PARAGRAPH, REJECTION

Claims 4-9 stand rejected under 35 U.S.C. §112, second paragraph, as allegedly indefinite in not reciting any specific elements. In response, those claims have been amended to include the respective elements. Withdrawal of this rejection is now respectfully requested.

V. THE OBVIOUSNESS REJECTION

Claims 1-12, 15, 16 and 22-37 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over DE 4212966 A1 to Stein *et al*. (Stein) in view of U.S. Patent Publication No. 2002/0164260 A1 to Koga *et al*. (hereinafter Koga). That rejection is respectfully traversed.

The present invention provides a powder metallurgically manufactured corrosion resistant steel material which is an alloy of the following composition in % by weight: max 0.12 C; 0.5-1.5 N; 12-18 Cr; max 0.5 Mn; max 0.5 Ni; 1-5 (Mo + W/2); min 0.3 Nb; max 1.5 (V + Nb/2 + Ti); 0.1-0.5 Si; from traces and up to max 2.0 Co; from traces and up to max 0.1 S. The balance is iron and incidental impurities.

In response to the obviousness rejection, and without conceding to the rejection, claim 1 has been amended to incorporate the subject matter of claim 16, and claim 16 has been cancelled without prejudice. Thus, amended claim 1 now specifies that the

material is a powder metallurgically manufactured corrosion resistant steel material which is an alloy of the composition in percentage by weight as recited in claim 1.

Stein and Koga each relate to cast steels, whereas the claimed steel of the present invention is a powder metallurgically manufactured steel (hereafter referred to as a PM-steel). The cast steels of Stein and Koga are not the same as the PM-steel of the present invention and, as will bb clear from the discussion below, one of ordinary skill as of the filing date of the present application would not have been motivated to arrive at the presently claimed PM-steel based on the Stein and Koga disclosures relating to cast steels.

As examples of notable differences between cast steels and PM-steels, a PM-steel has a much finer carbide structure and a more even distribution of carbides than a cast steel. In addition, differences between cast steels and PM-steels are emphasised the more highly alloyed the steels are. As a result, PM-steels not only have a higher strength, but also exhibit less variance in characteristics of the material, especially the larger the steel bars become.

Differences between a cast steel and a PM steel are also evident from Koga (see [0033]), where the problems of blow holes in the ingot in relation to the nitrogen content are discussed. PM-steels do not possess these problems.

In addition to the above differences, the invention as claimed is not suggested by Stein in terms of the composition of the claimed steel. Thus, referring to Table 1 of Stein as reproduced below (note Table 1 appears in the original text, whereas it is missing in the translation), two compositions of the invention (Stahl A and Stahl B) are reported together with two reference compositions (Stahl C and Stahl D). However, as

discussed in more detail below, Stahl A and B are both outside the presently claimed composition in regard to the contents of carbon, silica, nitrogen and niobium in the claimed steel material.

Tabelle 1

Legierungselement/Gew.-%	Stahl A %	Stahl B %	Stahl C %	Stahl D %
Kohlenstoff	0,23	0,16	0,47	0,12
Silizium	0,53	0,59	0,42	0,80
Mangan	0,48	0,52	0,43	0,35
Phosphor	0,011	0,008	0,008	0,013
Schwefel	0,019	0,021	0,025	0,018
Chrom	14,8	15,2	14,8	14,7
Molybdän	1,0	1,14	0,50	0,95
Wolfram	1,3	1,5	-	-
Nickel	0,31	0,57	-	0,12
Stickstoff	0,30	0,38	-	0,30
Vanadin	0,32	0,23	0,15	0,02
Niob	0,11	-	-	-

Looking at the four elements carbon, silica, nitrogen and niobium, the carbon ("Kohlenstoff") content of Stahl A and Stahl B is well above the upper limit as claimed in claim 1 (max 0.12 C). A disadvantage of a high carbon content is that it can cause precipitation of chromium carbides in the grain boundaries, and grain boundary carbides can result in an increased risk of intercrystalline corrosion. The present invention therefore claims a limit of max 0.12% C.

The silica ("Silizium") content of Stahl A and Stahl B is also above the upper limit as presently claimed (0.1-0.5 Si). Silicon is a strong ferrite former and lowers the range of the hardening temperature. The present invention therefore claims an upper limit of 0.5% Si.

The nitrogen ("Stickstoff") content of Stahl A and Stahl B is well below the lower limit as claimed (0.5-1.5 N). In the present invention, in order to obtain good corrosion properties, a comparatively large amount of nitrogen is present. Nitrogen contributes to

a uniform distribution of chromium in the austenite, and assists in generating better corrosion resistance by effectively preventing grain boundary precipitation.

The niobium ("Niob") content in Stahl A and Stahl B is also well below the lower limit as claimed (min 0.3 Nb). Niobium compounds may contribute to reducing grain size of the material, as well as providing a better hardness of the material at about equal toughness, and contributing to an improved wear resistance. The niobium content is therefore claimed at a minimum of 0.3%Nb.

In light of the above, it is clear that one of ordinary skill would not have been motivated to substitute a cast steel with a PM-steel in view of the numerous differences between cast steels and PM-steels and, even if such a substitution had been contemplated (it is believed such a substitution would not have occurred to one of ordinary skill), the claimed steel would not have resulted or have been rendered obvious thereby in view of the compositional differences in regard to several elements, as discussed above.

Absent any such motivation to arrive at the present invention based on the combined disclosures of Stein and Koga, a *prima facie* case of obviousness has not been generated in this case. Withdrawal of the obviousness rejection is respectfully requested.

Favorable action is awaited.

Respectfully submitted,

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